

AMENDMENTS TO THE CLAIMS:

Please amend the claims as follows. This listing of claims will replace all prior listings.

1. (CURRENTLY AMENDED) ~~An active~~ A vibration isolation system for reducing vibrations in a rotating system ~~rotatable about an axis of rotation, said system having a member rotating about an axis of rotation and generating vibratory loads~~, comprising:

a housing ~~disposed in combination with the~~ mounted to said rotating system and defining an internal chamber, ~~said housing rotatable independent of said rotating system~~;

a Magneto Rheological Fluid (MRF) disposed in said chamber, and means for selectively distributing said MRF within said chamber ~~for reducing said vibratory loads to selectively form an eccentric mass which reduces a vibratory load~~ active in said rotating system.

2. (CURRENTLY AMENDED) The active system according to claim 1 further comprising:

means a drive system for driving said housing at a rotational speed greater than the rotational speed of said rotating system;

~~— a stationary shaft disposed internally of said rotating member;~~

~~— an outer fairing disposed about said housing and rotating at the same rotational speed as the rotational speed of the system; and~~

~~wherein said distribution means further comprises:~~

at least one electromagnet disposed in combination with said ~~rotating~~ housing and adjacent said ~~housing internal chamber for rotating therewith~~;

~~at least one electromagnet disposed in combination with said outer fairing and proximal to said housing chamber;~~

~~a scupper disposed in combination with said stationary inner shaft and projecting into said chamber and contiguous with said MRF such that said housing rotates relative to said scupper and facilitating distribution of said MRF within said chamber;~~

a power source for energizing said electromagnets to generate a electromagnetic field within said chamber; and
~~means a control system~~ for controlling said electromagnets and said drive ~~means system~~ for selectively varying the viscous properties of said MRF within said chamber ~~to selectively form said eccentric mass.~~

3. (CANCELED)

4. (CURRENTLY AMENDED) The active force generation/isolation system according to claim 1 wherein said rotating system is a helicopter rotor system, said rotor system producing NP vibrations and ~~wherein said drive means a drive system which~~ rotates said housing at a absolute rotational speed of NP wherein P is the rotational speed of said helicopter rotor system and N is the number of blades.

5-10. (CANCELED)

11. (CURRENTLY AMENDED) A method for reducing vibrations in a rotating system, the method comprising the steps of:

enclosing a medium of variable viscosity in a housing ~~connected to rotating at a speed greater than~~ the rotating system;

sensing a rotational speed of the rotating system;

issuing a control signal responsive to the vibratory loads, the control signal activating a means to change the viscosity of the medium; and

redistributing the medium within the housing to reduce vibratory loads in the rotating system.

12. (NEW) A vibration isolation system for reducing vibrations in a rotating system which rotates about an axis of rotation, comprising:

a housing defining an internal chamber, said housing mounted to said rotating system for rotation about said axis of rotation independent of the rotating system;

a Magneto Rheological Fluid (MRF) partially filling said internal chamber, and

an electromagnetic field generation system mounted adjacent said internal chamber to azimuthally vary a viscosity of said MRF and distribute said MRF within said internal chamber to reduce a vibratory load in said rotating system.

13. (NEW) The vibration isolation system as recited in claim 12, wherein said internal chamber is driven about said axis of rotation at a rotational speed greater than the rotating system.

14. (NEW) The vibration isolation system as recited in claim 12, wherein said internal chamber is driven at an absolute rotational speed of NP in the direction of the rotating system where N is a number of rotor blades mounted to the rotating systems and P is the rotational speed of the rotating system.

15. (NEW) The vibration isolation system as recited in claim 12, wherein said internal chamber is driven at an absolute rotational speed of NP in a direction opposite of the rotating system where N is a number of rotor blades mounted to the rotating system and P is the rotational speed of the rotating system.

16. (NEW) The vibration isolation system as recited in claim 12, wherein said rotating system includes a main rotor system.

17. (NEW) The vibration isolation system as recited in claim 12, further comprising a drive system which includes an electric motor to drive said internal chamber about said axis of rotation at a rotational speed greater than the rotating system.

18. (NEW) The vibration isolation system as recited in claim 17, further comprising a generator which drives said electric motor, a phase of the voltage from said generator providing a phase reference to said control system indicative of a rotational speed of the rotating system.

19. (NEW) The vibration isolation system as recited in claim 1, further comprising a control system in communication with a vibration feedback sensor phase, said control system operable to control a speed of said electric motor in response to said vibration feedback sensor which issues vibration signals to said control system indicative of the vibratory load.

20. (NEW) The vibration isolation system as recited in claim 12, wherein said electromagnetic field generation system includes a multiple of electromagnets within said housing for rotation therewith and adjacent said internal chamber.

21. (NEW) A helicopter rotor system which rotates about an axis of rotation, comprising:

- a main rotor assembly having an N number of blades which rotates about an axis of rotation at a rotational speed of 1P, such that said main rotor system produces NP vibrations;

- a housing defining an internal chamber, said housing mounted to said main rotor assembly for rotation about said axis of rotation independent of said main rotor assembly;

- a Magneto Rheological Fluid (MRF) partially filling said internal chamber;

- a sensor system which senses the NP vibrations;

- a control system in communication with said sensor system, said control system operable to identify variations of the NP vibrations; and

- an electromagnetic field generation system mounted within said housing for rotation therewith and adjacent said internal chamber to azimuthally vary a viscosity of said MRF and distribute said MRF within said internal chamber to selectively form an eccentric mass in response to said control system to reduce said NP vibrations.

22. (NEW) The helicopter rotor system as recited in claim 21, further comprising a drive system which includes an electric motor to drive said internal chamber about said axis of rotation at an absolute rotational speed of NP in the direction of the main rotor assembly.

23. (NEW) The helicopter rotor system as recited in claim 21, further comprising a drive system which includes an electric motor to drive said internal chamber about said axis of rotation at an absolute rotational speed of $(N+1)P$ in a direction opposite of the main rotor assembly.

24. (NEW) A method of reducing vibrations in a helicopter rotor system which rotates about an axis of rotation comprising the steps of:

(1) rotating a housing mounted to a main rotor assembly about the axis of rotation independent of the main rotor assembly, the housing having an internal chamber at least partially filled with a Magneto Rheological Fluid (MRF);

(2) sensing a vibration generated by the main rotor assembly; and

(3) varying an electromagnetic field about the internal chamber to azimuthally vary a viscosity of said MRF and distribute said MRF within said internal chamber to form an eccentric mass in response to said step (2) to reduce the vibration.

(4) Varying an electric motor speed that drives the housing to match the optimal load reducing phase based upon controller commands.

25. (NEW) A method as recited in claim 24, wherein said step (3) further comprises varying the electromagnetic field in response to a predetermined schedule.

26. (NEW) A method as recited in claim 24, wherein said step (3) further comprises sensing a trend in a variation of the vibrations generated by the main rotor assembly; and varying the electromagnetic field in response to the trend.

27. (NEW) A method as recited in claim 24, wherein said step (3) further comprises:
forming the eccentric mass in response to a commanded strength of the electromagnetic
field position.

28. (NEW) A method as recited in claim 27, further comprising the step of:
mechanically driving a generator in response to a speed of the main rotor assembly, the
rotational speed of the generator being a fixed multiple of the speed of the main rotor assembly
NP frequency;
driving an electric motor which drives the internal chamber with the generator; and
determining a phase reference signal from a voltage of the generator to indicate a rotational
speed of the main rotor assembly.
determining the optimal phase of the electric motor from the phase of said phase reference.